How Does Frequency Change ?

Notional Frequency

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$$nF = \frac{Vn \times Fog}{Vog}$$

Derivation

This equation can be derived from the fact that Velocity of sound wave is equal to the product of ‘lambda’ and frequency of the sound source.

Thus,

$$\text{Frequency} = \frac{\text{Velocity Of Sound}}{\text{‘lambda’}}$$

But this ‘lambda’ has been derived from the fact that lambda = Velocity / Frequency

Thus,

$$\text{Notional Frequency} = \frac{(\text{Velocity Of Sound in New Medium} \times \text{Original Frequency})}{\text{Velocity Of Sound In Original Medium}}$$

- Velocity of sound in a new medium is the velocity of sound waves in that new medium where the waves have entered.
- Original Frequency is defined as the initial frequency of sound waves produced by a sound source.
- Velocity of sound in the original medium is the velocity of sound waves in the medium where the wave has initiated.
- Notional Frequency is the product of this equation.

Definition of Notional Frequency

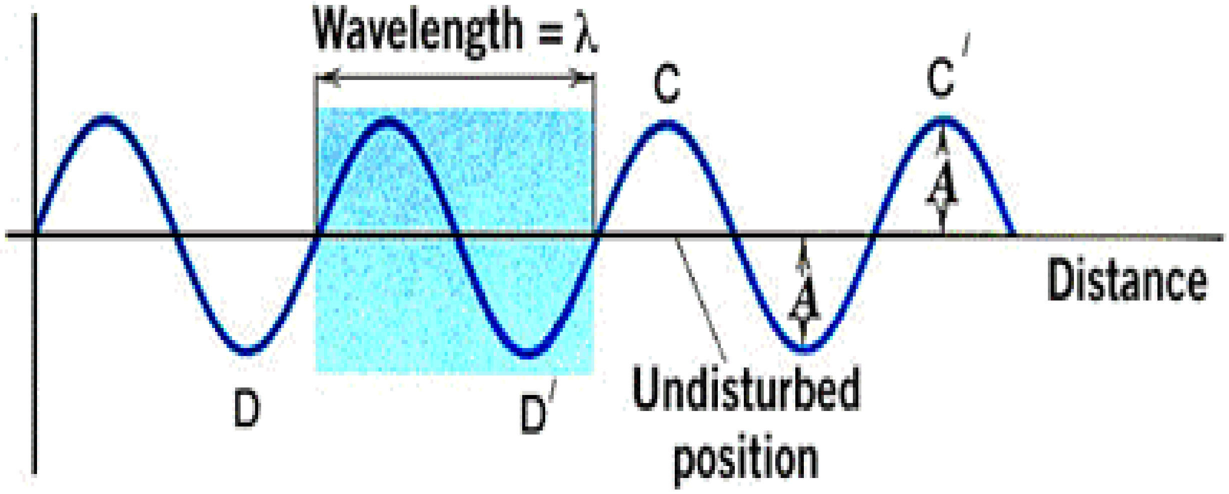
- Notional Frequency, as it is clear from its name, is the frequency of a sound wave that is not the actual or absolute but the imaginary i.e. depends on our perception of ear and brain.
- Notional Frequency can be understood as the changed frequency occurring due to change in medium, in fact the actual frequency will remain the same but due to abnormal movement of molecules of medium there is a perception created in our brains.

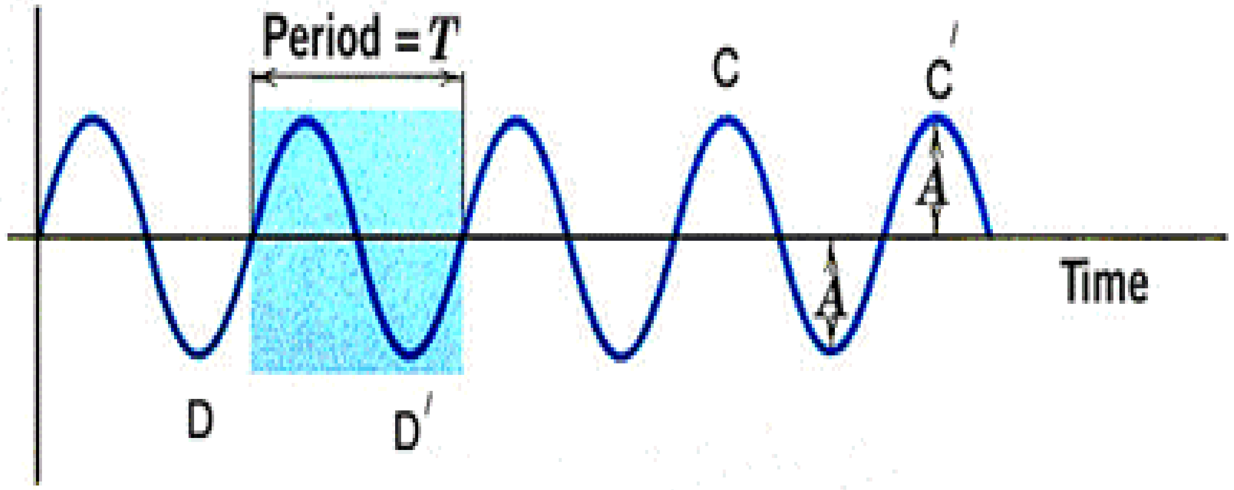
> *“Notional Frequency is just like the temperature we are feeling that is different from actual temperature”*

NOTE: Notional Frequency is just the imaginary concept that has a proof but it is not practical.

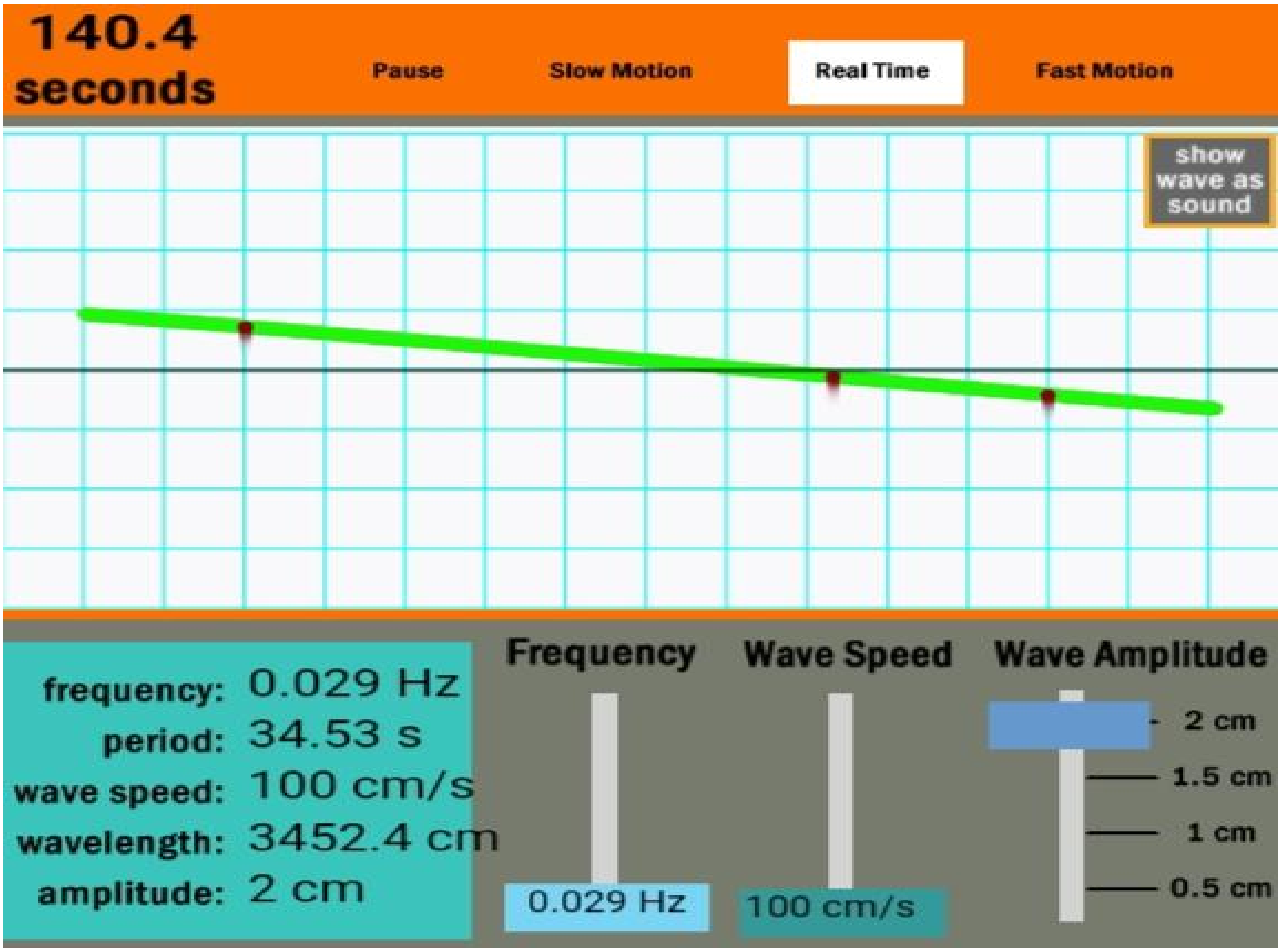
Proof of Notional Frequency :

- Before going to the proof of' 'Notional Frequency',I want to make it clear that this proof is just theoretical proof and does not have any practical evidence.





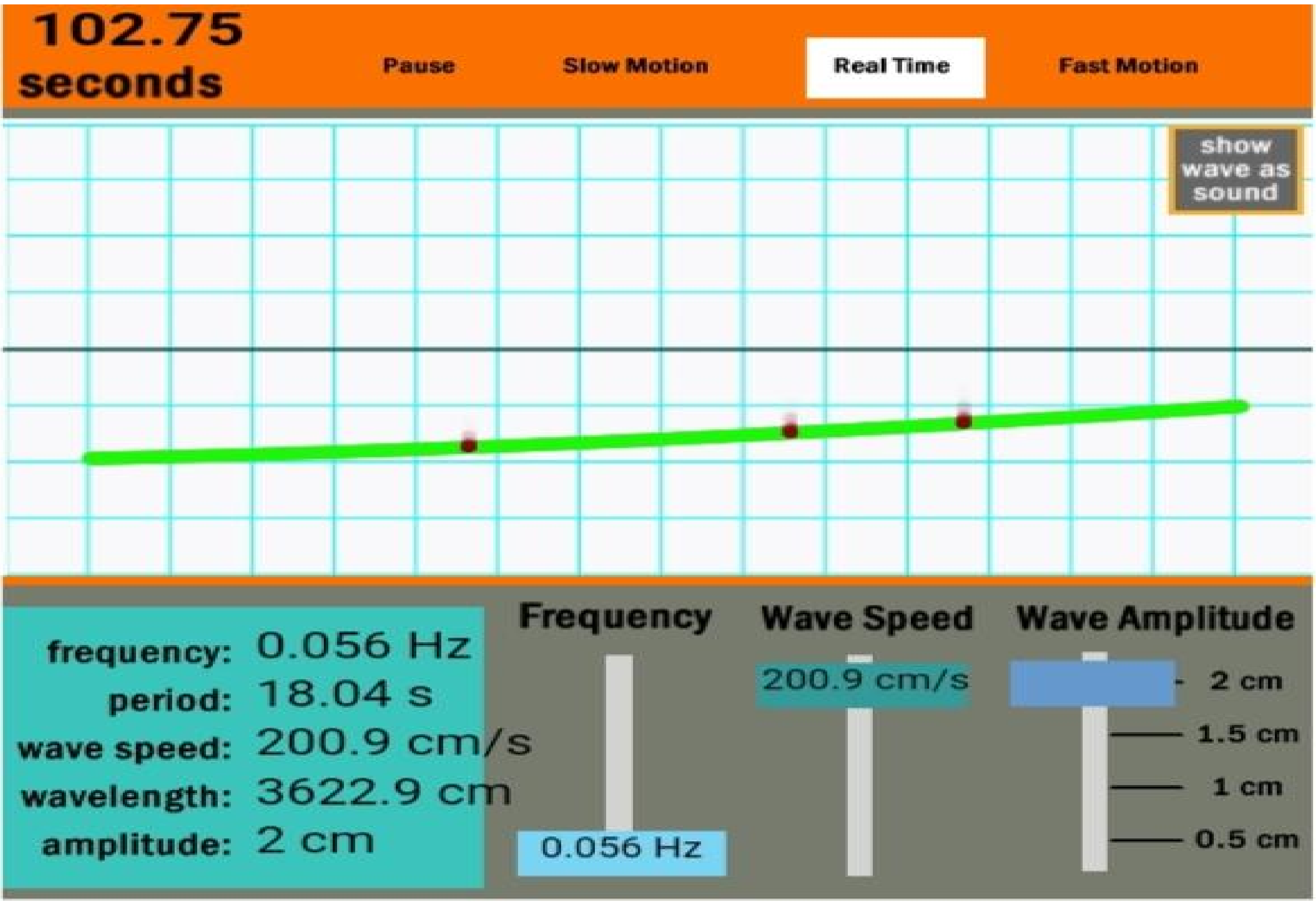
Experiment 1 :


140.4 seconds

frequency: 0.029 Hz
period: 34.53 s
wave speed: 100 cm/s
wavelength: 3452.4 cm
amplitude: 2 cm

In the above wave motion the frequency is 0.029 Hz and Wave Speed is 100 cm/s.The result wavelength is found to be 3452.4 cm.

Experiment 2 :



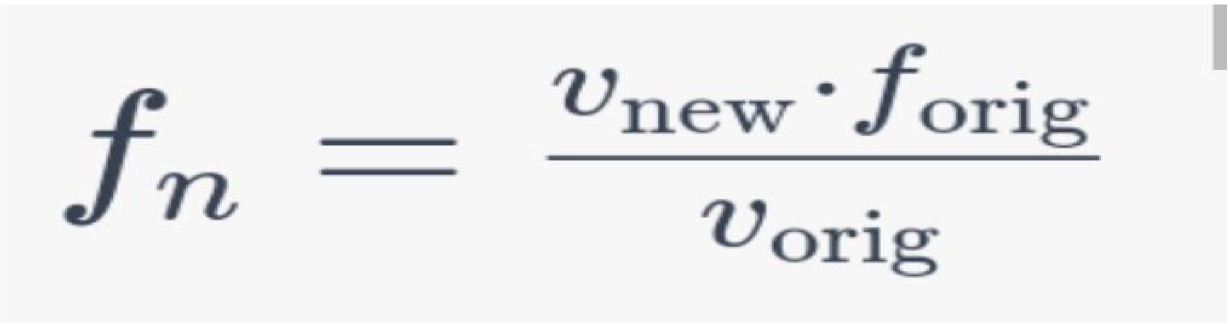
102.75 seconds

frequency: 0.056 Hz
period: 18.04 s
wave speed: 200.9 cm/s
wavelength: 3622.9 cm
amplitude: 2 cm

Frequency: 0.056 Hz
Wave Speed: 200.9 cm/s

By doubling both the frequency and wave speed in that manner the ratio remains the same we have found that wavelength is constant.

Maybe it seems simple mathematics but this leads to the derivation of above equation..



$$f_n = \frac{v_{\text{new}} \cdot f_{\text{orig}}}{v_{\text{orig}}}$$

Application Of Notional Frequency

Here is the simple application of this concept.

	In Air	**In Water**
Original Frequency	1000 Hz	1000 Hz
Notional Frequency	1000 Hz	4354 Hz

*Velocity in Air ≈ 344 m/s and in water ≈1497 m/s

"This concept is going to be used widely by the researchers."